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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,319	08/11/2006	Gandara Amarasinghe	187468/US/DJB/VEJ	7627
75149	7590	10/01/2008	EXAMINER	
Dorsey & Whitney LLP			SYKES, ALTREV C	
US Bank Center			ART UNIT	PAPER NUMBER
1420 Fifth Avenue				1794
Suite 3400				
Seattle, WA 98101-4010				
MAIL DATE		DELIVERY MODE		
10/01/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,319	AMARASINGHE ET AL.	
	Examiner	Art Unit	
	ALTREV C. SYKES	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-33 is/are pending in the application.
 - 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1-33 is/are rejected.
- 7) Claim(s) ____ is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. ____ .
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)	5) <input type="checkbox"/> Notice of Informal Patent Application
Paper No(s)/Mail Date <u>20060808, 20071210</u> .	6) <input type="checkbox"/> Other: ____ .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 5 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 5, it is noted by examiner that the applicant requires in claim 1 that the phase change material consist of a blend of at least two compounds. As such, it is unclear to examiner for claim 5 if the phase change material as a whole (i.e. the combination of the at least two compounds) is to have the heat of fusion of 150 kj/kg to 250 kj/kg or if each compound in the combination is to have that property. For examination purposes at this time, the limitation will be treated as though each compound in the blend is to comprise the required heat of fusion of applicant.

Regarding claim 10, it is unclear to examiner if the laminate is required to have a layer of biaxially oriented nylon or if that is an optional limitation. As the instant specification provides no further clarification, the limitation will be treated as optional because of its enclosure in parentheses.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
 1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1-6, 13-15, 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scaringe et al. (US 4,856,294) in view of Doherty (US 6,185,742) as evidenced by Bo et al. technical paper. *Parrafin Waxes and Their Binary Mixtures as Phase Change Materials (PCMs) for Cool Storage in District Cooling System.*

Regarding claims 1, 2, 4, 13,17 Scaringe et al. discloses a micro-climate cooling vest of lightweight material of double wall construction, the body-proximate portion of which is comfortable and compatible with the clothing or skin of the wearer contains an internal liner portion comprised of a sealable insulative pocket that contains a heat transfer material that changes phase from solid to liquid within a practical range (e.g. 60°-90°F.) of desired body temperature cooling action, and operates to draw body heat away from the wearer in the course of its phase change from solid to liquid state. (See Abstract) It is noted by examiner that 60°-90°F is equivalent to 15°-32°C therefore the melting point limitation is met. The vest-type garment made of lightweight material (e.g. nylon cloth) has an interior cross-section of double wall construction, the body-proximate

portion (the nylon cloth) of which is comfortable and compatible with the clothing or skin of the wearer and the internal portion of which is comprised of a sealable insulative pocket or liner, having a thickness on the order of 1"-2", that contains a heat exchange or thermal energy-transfer material that changes phase.(See Col 1, lines 66-68 and Col 2, lines 1-10) Because the phase change material is initially in solid form when the vest is placed on the wearer, the liner is provided with a plurality of vertically extending seams 16 joining opposite sides of the liner together, so as to effectively compartmentalize the liner into a plurality of adjacent packets or chambers 17 and provide fold points for the liner to permit the vest to be comfortably wrapped around the body. (See Col 4, lines 48-55) Examiner equates the adjacent packets (or chambers) of Scaringe et al. to the discrete pouches as claimed by applicant. As such, the seams of the liner would provide the additional flexibility needed in the vest. If it is desired to achieve cooling action in the middle portion of the above range, a heat transfer material such as n-octadecane, which changes state at 82°F, may be employed. (See Col 2, lines 30-34) For the above temperature range preferred materials include chloroacetic acid-o-cresol eutectic, tetradecylbenzene, sodium chromate decahydrate, n-octanoic acid, chloroacetic acid-phenol eutectic, acetic acid, a salt mixture of 37% NaSO₄, 17% NaCl and 46% water, 1-octadecene, glycerol, n-hexadecane, polyethylene glycol 600, double clathrate of water with tetrahydrofuran and hydrogen sulfide, lithium chloride ethanolate, n-Heptadecane, copper nitrate hexahydrate, lactic acid, manganous nitrate hexahydrate, n-octadecane, methyl palmitate, 3-methylpentacosane, orthophosphoric acid hemihydrate, lithium nitrate trihydrate, calcium chloride hexhydrate, gallium and sodium sulfate decahydrate.

(See Col 2, lines 16-30) If the skin surface temperature should begin to drop below the melting point of the diode (phase) material (e.g. 82°F. (27°C) for n-octadecane), then the diode (phase) material will solidify. (See Col 3, lines 35-37) Examiner equates diode material to phase change material of applicant. Depending upon the thermal environment to which the worker is exposed, by choice of the appropriate phase change material, the vest may provide cooling for a period of up to four hours (at a rate of 200 J/sec.), or a total energy storage capacity of $2.88*10^6$ Joules. (See Col 5, lines 35-40)

While Scaringe et al. does disclose the use of phase change materials, the reference does not specifically disclose the use of a mixture (blend) of at least two compounds.

Doherty discloses a micro-climate garment (vest or shirt) particularly adapted for use by welder's, hot metal workers and others wherein that garment incorporates a phase change material having a melting/freezing temperature of, for example, 50-60°F. (10-15 °C) to provide personal cooling in harsh, high temperature environments thereby allowing the wearer to work comfortably in such environments over a longer period of time before requiring relief. (See Col 1, lines 8-21) Preferably, the phase change material utilized in the garment of the present invention is at least one n-alkane. More specifically, the phase change material may be selected from a group including tetradecane, pentadecane, hexadecane, heptadecane and mixtures thereof. In the most preferred embodiment the phase change material is a mixture of tetradecane and hexadecane providing a melting/freezing temperature of approximately 55°F (12°C). (See Col 3, lines 4-13)

As Scaringe et al. and Doherty are both directed to the use of phase change materials in garments, the art is analogous. Therefore, to one of ordinary skill in the art at the time of the invention it would have been obvious to try the use of more than one phase change material in order to tailor the garment specifically to a user or environment to provide for the totally expected result of providing a cooling action. Doing so would also allow for the tailoring of the length of time the cooling action would last as disclosed by Scaringe et al. (See Col 5, lines 35-40)

Modified Scaringe et al. fails to teach a melting temperature range of from 1 to 5°C or from 1 to 4°C. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the melting temperature range since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The burden is upon the Applicant to demonstrate that the claimed melting temperature range is critical and has unexpected results. In the present invention, one would have been motivated to optimize the melting temperature range motivated by the desire to tailor the garment for a specific environment or user. It is noted by examiner that applicant provides no additional steps necessary to give the required melting temperature range outside of choosing a phase change material (PCM) comprising a mixture of alkanes typically having from 5 to 20 carbon atoms. For example, the PCM may comprise a mixture of predominantly (at least 90%) C₁₀-C₂₀, or C₁₅-C₂₀, n-alkanes. Preferably, the mixture comprises predominantly (at least 90%) C₁₄-C₁₈ or C₁₆-C₁₈, n-alkanes. (See Applicant's Spec [0019]-[0020]) As it

would have been readily known in the art via General Chemistry at the time of the invention that tetradecane has 14 carbon atoms and hexadecane has 16 carbon atoms, it is noted by examiner that the mixture of phase change material as taught by Doherty would provide the necessary melting temperature range. Therefore, the melting temperature range would depend greatly on the blend of compounds chosen to make up the phase change material and could be easily modified by one of ordinary skill in the art.

Regarding claim 3, Scaringe et al. discloses if it is desired to achieve cooling action in the middle portion of the range(60°-90°F or 15°-32°C), a heat transfer material such as n-octadecane, which changes state at 82°F or 27°C, may be employed. (See Col 2, lines 30-34) Doherty discloses the phase change material may be selected from a group including tetradecane, pentadecane, hexadecane, heptadecane and mixtures thereof. (See Col 3, lines 4-13) As such, it is noted by examiner that it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the disclosures of Scaringe et al. and Doherty to provide for a blended phase change material having a melting point of about 22°C. The modification would have been motivated by the desire to tailor the garment for its intended end use and environment.

Regarding claim 5, it is noted by examiner that tetradecane has a heat of fusion of 227 kj/kg and hexadecane has a heat of fusion of 236 kj/kg. (See Table 1, pg. 47 in Bo et al. *Parrafin Waxes and Their Binary Mixtures as Phase Change Materials (PCMs) for Cool Storage in District Cooling System* technical paper)

Regarding claim 6, it is further noted by examiner that as the melting point and melting temperature range of the blended phase change material is dependent upon the

material compounds of choice, the percent expansion for that blend would also be dependent upon the choice of compounds in the blend. As such, it would have been well within the ordinary skill of one in the art at the time of the invention to tailor the garment for its intended end use and environment by modifying the combination of compounds as taught by Doherty to provide for selected properties in the final phase change material.

Regarding claim 14, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the heat exchange surface area to volume ratio since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The burden is upon the Applicant to demonstrate that the claimed heat exchange surface area to volume ratio is critical and has unexpected results. In the present invention, one would have been motivated to optimize the heat exchange surface area to volume ratio motivated by the desire to provide a large surface area where the phase change material may come in contact with the skin or clothing of the user to provide necessary cooling. It is noted by examiner that Scaringe et al. discloses a vest where the back and chest enclosing portions comprise the heat exchange material. (See Col 4, lines 8-14) Therefore, the heat exchange surface area to volume ratio could very easily be modified to provide for the ratio as claimed by applicant.

Regarding claims 15 and 20, Scaringe et al. discloses when emptied of phase change material, liner 11 may be inserted into or removed from the vest by way of a

zipper 19 at the lower portion of the back portion 14. (See Figure 2, and Col 4, lines 57-61)

Regarding claim 16, Scaringe et al. discloses the vest-type garment made of lightweight material (e.g. nylon cloth) has an interior cross-section of double wall construction, the body-proximate portion (the nylon cloth) of which is comfortable and compatible with the clothing or skin of the wearer and the internal portion of which is comprised of a sealable insulative pocket or liner. (See Col 1, lines 66-68 and Col 2, lines 1-10) Because the phase change material is initially in solid form when the vest is placed on the wearer, the liner is provided with a plurality of vertically extending seams 16 joining opposite sides of the liner together, so as to effectively compartmentalize the liner into a plurality of adjacent packets or chambers 17 and provide fold points for the liner to permit the vest to be comfortably wrapped around the body. (See Col 4, lines 48-55) Examiner equates the adjacent packets (or chambers) of Scaringe et al. to the discrete pouches as claimed by applicant. It is further noted by examiner that applicant attributes the breathability of the garment to the use of pouches comprising the PCM which enable a flexible garment with good cooling efficiency to be prepared. (See [0047]) As Scaringe et al. has met the limitations of a garment containing packets comprising PCM, it is noted by examiner that the breathability limitation of applicant would also be met.

Regarding claim 18, while Scaringe et al. does not specifically disclose the pouches are provided in a rib-like arrangement across the front and back of the jacket or vest, the reference discloses a vest where the back and chest enclosing portions comprise the heat exchange material. (See Col 4, lines 8-14). It is noted by examiner that the

arrangement of the pouches would provided nothing more than an entirely expected result of faster cooling by maximizing the surface area of the garment in close contact with the user.

Regarding claim 19 Scaringe et al. discloses the vest will flex or fold about seams 16, so that it can be worn comfortably. (See Col 5, lines 26-27)

Regarding claims 21-24 Scaringe et al. discloses to augment the cooling action of the vest, an additional layer of ice may be used in conjunction with the primary phase change material, with the primary phase change material acting as a thermal diode. (See Abstract) Compared to the material that changes state within the above-mentioned operating range, water has a very high heat of fusion; however, as noted previously, its phase change from solid to liquid (32.degree. F.) is too low for comfortable direct contact with the skin. When used in combination with one of the above-mentioned primary phase change materials, however, water (ice) serves as a thermal energy storage medium that assists the primary heat exchange material in providing the desired cooling effect. (See Col 2, lines 56-65) To this end, the interior liner of the vest may include an ice packet, separate from the primary heat exchange material, sandwiched between an outer layer of expanded from insulation material and a thin (1"-2" cross-sectional thickness) region of heat exchange material adjacent to the interior cloth material of the vest that contacts the skin or clothing of the user. (See Col 2, lines 66-68 and Col 3, lines 1-4) Because the primary heat exchange material changes state at a temperature which is within an acceptable skin 'comfort' zone, the surface of the skin of the wearer remains comfortable, while obtaining the benefit of the high heat of fusion of the augmenting ice pack. In

effect, the primary heat exchange material acts as a thermal diode, changing state from solid to liquid phase and thereby drawing heat away from the surface of the skin of the vest wearer to the adjacent 'cold storage ice pack, as necessary to supply the intended cooling function. (See Col 3, lines 4-14)

Regarding claims 26-33, it should be noted that the recitations of "the use of an article for the cooling of an athlete, to reduce the core body temperature, to provide a cooling garment to be worn under protective clothing, use of an article in medicine, and use of an article for the management and/or treatment of head trauma" is considered to be an intended use statement and is not given patentable weight at this time since the prior art meets the structural and/or chemical limitations set forth and there is nothing on record to evidence that the prior art product could not function in the desired capacity or that there is some additional implied structure associated with the terms. The burden is shifted upon the Applicant to evidence the contrary.

4. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doherty (US 6,185,742)

Regarding claim 25, Doherty discloses a micro-climate garment (vest or shirt) particularly adapted for use by welder's, hot metal workers and others wherein that garment incorporates a phase change material having a melting/freezing temperature of, for example, 50-60°F (10-15 °C) to provide personal cooling in harsh, high temperature environments thereby allowing the wearer to work comfortably in such environments over a longer period of time before requiring relief. (See Col 1, lines 8-21) Preferably,

the phase change material utilized in the garment of the present invention is at least one n-alkane. More specifically, the phase change material may be selected from a group including tetradecane, pentadecane, hexadecane, heptadecane and mixtures thereof. In the most preferred embodiment the phase change material is a mixture of tetradecane and hexadecane providing a melting/freezing temperature of approximately 55°F (12°C). (See Col 3, lines 4-13) It would have been obvious to one of ordinary skill in the art at the time of the invention to simply choose a phase change material having the melting points of 6°C and 22°C as claimed by applicant. Amongst those phase change materials suggested by Doherty et al. examiner notes that tetradecane has a melting point of 5.8°C and Heptadecane has a melting point of 21°C. Therefore, the modification would have been well within one of ordinary skill in the art.

Doherty et al. fails to teach a melting temperature range of from 1 to 5°C or from 1 to 4°C. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the melting temperature range since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The burden is upon the Applicant to demonstrate that the claimed melting temperature range is critical and has unexpected results. In the present invention, one would have been motivated to optimize the melting temperature range motivated by the desire to tailor the garment for a specific environment. It is noted by examiner that applicant provides no additional steps necessary to give the required melting temperature range outside of choosing a phase

change material (PCM) comprising a mixture of alkanes typically having from 5 to 20 carbon atoms. For example, the PCM may comprise a mixture of predominantly (at least 90%) C₁₀-C₂₀, or C₁₅-C₂₀, n-alkanes. Preferably, the mixture comprises predominantly (at least 90%) C₁₄-C₁₈ or C₁₆-C₁₈, n-alkanes. (See [0019]-[0020]) As it would have been readily known in the art via General Chemistry at the time of the invention that tetradecane has 14 carbon atoms and hexadecane has 16 carbon atoms, it is noted by examiner that the mixture of phase change material as taught by Doherty would provide the necessary melting temperature range. Therefore, the melting temperature range would depend greatly on the blend of compounds chosen to make up the phase change material and could be easily modified by one of ordinary skill in the art.

5. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scaringe et al. (US 4,856,294) in view of Doherty (US 6,185,742) as applied to claim 1 above, and further in view of Hatfield. (US 4,708,812)

Regarding claim 7, modified Scaringe et al. discloses all of the claim limitations as set forth above. Scaringe et al. further discloses such a material may be stored in a multi-seamed vest-shaped liner comprised of a durable, light-weight plastic, such as vinyl or polyurethane, located adjacent to the skin area-contacting nylon cloth, where body cooling is to be imparted. (See Col 2, lines 34-38) However, the reference does not specifically teach the phase change material is encapsulated by a laminate film and the

laminate comprises an outer heat-sealing layer and an inner layer which is impermeable to the phase change material.

Hatfield discloses solid phase change materials are encapsulated in a condensation polymeric shell to provide heat storage material. The encapsulated phase change material has little or no significant loss of its latent heat of fusion due to its encapsulation. (See Abstract) The phase change material is encapsulated with a condensation polymeric film using interface polymerization technique. (See Col 7, lines 1-4) It is noted by examiner that once a film as taught by Hatfield encapsulates the phase change material, there would inherently be an outer heat sealing layer as the reference teaches that there is no significant loss of its latent heat of fusion thereby sealing in the heat. Hatfield also discloses as the volume of the phase change material is different for each phase it is in during its usage, the encapsulating shell is advantageously elastomeric. The polymeric shell is formed when the phase change material is in the solid state and can resiliently expand to accommodate the increased volume of the phase change material in its liquid state. The elastomeric shell shrinks snuggly around the phase change material when it returns to solid phase. (See Col 7, lines 51-60) Hatfield discloses the solid phase change material particles are contacted with a reactive monomer which is in a liquid state. The monomer is not reactive with the solid phase change material particles. The monomer forms a coating thereon on the surface of the solid phase change material particles. The coated phase change material particles are contacted with a flexible monomer (or prepolymer) which is terminated with reactive groups. The monomers (or monomer and prepolymer) are condensation polymerized to form a continuous,

elastomeric, condensation polymeric shell around the particles. (See Col 8, lines 37-55)

It is noted by examiner that the monomer coating would provide for an inner layer which is impermeable to the phase change material. Of course, the solvent used at the surface must not interact with the phase change material. (See Col 9, lines 15-25) Hatfield further discloses multiple layers can be formed. (See Col 10, lines 44-45) The encapsulation material of Hatfield meets the limitations as claimed by applicant.

Regarding claim 8, it is further noted by examiner that the layers as taught by Hatfield are both heat sealing and impermeable to the phase change material. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the Hatfield teaching to provide for a three-layer film encapsulating the phase change material. As such, it is noted by examiner that three layers of the encapsulation material as taught by Hatfield would meet the limitations as claimed by applicant with the expected result of preventing the migration of the phase change material during actual phase change thereby providing increased effectiveness with controlled cooling of the user.

Regarding claim 9, modified Scaringe fails to teach the overall thickness of the laminate is from 30 to 150 μm . It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the laminate thickness since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The burden is upon the Applicant to demonstrate that the claimed laminate thickness is critical and has

unexpected results. In the present invention, one would have been motivated to optimize the laminate thickness motivated by the desire to provide increased insulation of the phase change material to prevent loss of its latent heat of fusion as taught by Hatfield.

6. Claims 10-12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scaringe et al. (US 4,856,294) in view of Doherty (US 6,185,742) as applied to claim 1 above, and further in view of Hatfield. (US 4,708,812) and Bleemberg et al. (US 6,500,514)

Regarding claim 10, modified Scaringe et al. discloses all of the claim limitations as set forth above, but the reference does not disclose the laminate comprises a layer of nylon interposed between layers of LLDPE.

Bleemberg et al. discloses a film structure may include a barrier material made from nylon or other thermally sensitive barrier material encapsulated by a first adhesive material. The barrier material and the first adhesive material form a barrier layer and a first set of adhesive layers when coextruded. The barrier layer and the first set of adhesive layers may be coextruded at the same or a similar temperature to form a first extrudate. The first set of adhesive layers protects the barrier layer from high temperatures and long residence times related to the coextrusion/lamination process that may degrade the barrier layer and increase production costs. (See Abstract and Col 3, lines 45-50) Typical methods of coextrusion generally entail feeding the barrier material and adhesive resins into a feedblock where they are arranged into an "A/B/A" configuration prior to extrusion through a die. The adhesive layers must be compatible with the barrier layer as well as the substrates that are being laminated or coated. (See Col 2, lines 3-6) FIG. 2A shows an

improved structure 100 that may be produced. The structure 100 may include a barrier layer 110 that may be completely encapsulated by first adhesive layers 112. The barrier layer 110 may be composed of any thermoplastic polymeric material that may prevent the migration of molecules such as, for example, oxygen and water vapor, thereby protecting sensitive materials contained within packages made from the structure 100. For example, the structure 100 may be utilized as a bag that may be sealed on all sides and may completely surround an article of food contained therein. The barrier layer 110 may preferably be made from a material having superior barrier properties such as, for example, polymers and/or copolymers of EVOH and EVOH blends of nylon or polyethylene. (See Col 5, lines 15-28) The barrier layer 110 may be protected by the first adhesive layers 112 that may encapsulate the barrier layer 110 via the system described in FIG. 1. The first adhesive layers 112 may be coextruded to encapsulate the barrier layer 110 to create a first encapsulated extrudate 113 composed of a barrier layer 110 completely surrounded by first adhesive layers 112. (See Col 5, lines 34-40) Referring now to FIG. 2B, the first extrudate 113 may be coextruded with an adhesive layer 130 on a surface of the first extrudate 113. Another adhesive layer 132 may be coextruded on an opposite surface of the first extrudate 113. The adhesive layers 130, 132 may be the same material or, alternatively, may be composed of different materials. (See Col 6, lines 1-5) Finally, polyethylene such as low density polyethylene ("LDPE"), linear low density polyethylene ("LLDPE"), medium density polyethylene ("MDPE") and HDPE may be used as the adhesive layers 114, 130, 132 and/or 134 to tie the adhesive layers 112 to many other types of layers. (See Col 7, lines 26-32) It is first noted by examiner that the

Bleemberg et al. disclosure provides for a three-layer laminate wherein a barrier layer of nylon would be encapsulated by first adhesive layers which may be the same material. Additionally, as shown in Fig. 2B, the barrier layer 110 may be extruded with adhesive layers 130 and 132 which Bleemberg et al. discloses may be LLDPE. As such, the limitations as claimed by applicant are met.

As modified Scaringe et al. and Bleemberg et al. are both directed to laminates, the art is analogous. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the laminate layers as taught by Bleemberg et al. to encapsulate the phase change material for the added benefit of reducing costs of making the needed film structure when utilized within high temperature coextrusion/lamination processes. (See Col 3, lines 25-30 and 45-50)

Regarding claims 11 and 12, while Bleemberg et al. discloses an encapsulated barrier for flexible films, the reference does not disclose wherein the nylon layer is from 10 to 50 μ m (15 μ m) thick and the LLDPE layers from 50 to 100 μ m (51 μ m) thick. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the thickness since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The burden is upon the Applicant to demonstrate that the claimed thickness is critical and has unexpected results. It would have also been well within the skill of one in the art at the time of the invention to optimize the layers as taught by Bleemberg for the laminate structure motivated by the desire to control production costs

while still maintaining the flexibility of the end product film that would be used in the cooling garment as disclosed by modified Scaringe above.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALTREV C. SYKES whose telephone number is (571)270-3162. The examiner can normally be reached on Monday-Thursday, 8AM-5PM EST, alt Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1254. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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9/23/08

/Carol Chaney/
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